Resources Available to You

Production Systems on the Open Computing Facility (OCF)

Advanced Simulation and Computing Resources (ASC)

ALC: Intel Linux cluster of Pentium 4 Prestonia processors for **parallel**[a] processing
Composed of: 960 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

Frost: IBM SP system for Tri-lab **parallel**[a] processing
Composed of: 68 nodes. Each node has 16 CPUs and 16 GB memory.
Currently running:[b] AIX

Multiprogrammatic & Institutional Computing Resources (M&IC)

GPS: Cluster of 48 Compaq ES45s and D520Es and one GS320
Composed of: 48 nodes. Each node has 2–4 CPUs and 2–32 GB memory; gps320 has 32 CPUs and 32 GB memory.
Currently running:[b] Tru64 Unix

ILX: Intel Linux cluster of Pentium 4 Xeon processors
Composed of: 67 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

MCR: Intel Linux cluster of Pentium 4 Xeon processors for **parallel**[a] processing
Composed of: 1152 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

TC2K: Compaq Sierra cluster of Alphaserver ES40s for **parallel**[a] processing
Composed of: 128 nodes. Each node has 4 CPUs and 2 GB memory.
Currently running:[b] Tru64 Unix

Core Resources

Pengra: Production Capacity Resource (PCR) Intel Linux cluster for **parallel**[a] processing
Composed of: 16 nodes. Each node has 2 CPUs and 2 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

Production Systems on the Secure Computing Facility (SCF)

Advanced Simulation and Computing Resources (ASC)

White: IBM SP system for Tri-lab **parallel**[a] processing
Composed of: 512 nodes. Each node has 16 CPUs and 16 GB memory.
Currently running:[b] AIX

Ice: IBM SP system for **parallel**[a] processing
Composed of: 27 nodes. Each node has 16 CPUs and 16 GB memory.
Currently running:[b] AIX

Lilac: IBM Linux cluster of Pentium 4 Xeon processors for **parallel**[a] processing
Composed of: 768 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

UM: IBM SP system for **parallel**[a] processing
Composed of: 128 nodes. Each node has 8 CPUs and 16 GB memory.
Currently running:[b] AIX

Core Resources

SC: Cluster of Compaq Alphaserver ES40 and ES45 systems
Log onto: sc1, sc2, sc39, sc40
Composed of: 40 nodes. Each node has 4 CPUs and 1.5 GB memory.
Currently running:[b] Tru64 Unix

ACE: Intel Linux cluster of Pentium 4 Xeon processors
Composed of: 160 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

Adelie: PCR Intel Linux cluster for **parallel**[a] processing
Composed of: 128 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

Emperor: PCR Intel Linux cluster for **parallel**[a] processing
Composed of: 128 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

CUB: Intel Linux cluster of Itanium 2 processors
Composed of: 4 nodes. Each node has 2 CPUs and 4 GB memory.
Currently running:[b] CHAOS (based on Red Hat Linux)

For more information about LC systems, including hardware and operating system level, see
http://www.llnl.gov/computing/hpc/resources/index.html
For more information about graphics support, visualization, and simulation, see
the Information Management & Graphics Group Web site at http://www.llnl.gov/icc/sdd/img/

Note: Unless otherwise noted, all "Log onto" addresses are <host>.llnl.gov

[a]Systems noted as **parallel** are intended for parallel jobs running across multiple nodes.
[b]Please see the message of the day (MOTD) displayed at login for the latest operating system version.
[c]Reference documents can be accessed at http://www.llnl.gov/computing/hpc/documentation/user_manual_index.html

How Do I Access LC Resources?

The OTP (one-time password) is used for authentication to all OCF LC resources. Either an OTP or a Distributed Computing Environment (DCE) password is used for authentication to all SCF LC services.

Remote Access Accounts

From outside llnl.gov, you will also need a remote access account to get through the llnl.gov firewall.

- **IPA (IP Allow)**: Authenticate to the IPA service from your Web browser. The service then allows your IP address through the firewall.
- **VPN (Virtual Private Network)**: Install the VPN client on the machine from which you are coming. The service gives you a virtual internal llnl.gov IP address.
- **OTS (Open Terminal Server)**: Use a telephone connection to log into the OTS modem pool and access llnl.gov resources as if you were on site.

More information about access accounts is available at https://access.llnl.gov/ or contact the Open LabNet Help Desk (2-4090).

For information on all LC access issues, see the EZACCESS Basic Login Guide.[c]

Secure SHell (SSH)

Secure Shell is the only login method for LC systems. An SSH client is necessary on any host used to access LC systems. SSH includes SCP or SFTP for file transfers between hosts.

From an llnl.gov host to access LC host lc_host.llnl.gov:
```
ssh <lc_host>
```

If your user name is different on LC resources than on the machine from which you are coming, you will need to specify your LC user name. On UNIX systems, this is done with the −l option:
```
ssh −l <lcusername> <lc_host>
```

From outside llnl.gov, you must specify port 922 with SSH, and you must specify the full domain name for the LC host. With UNIX systems, this is done with the −p option:
```
ssh −p922 <lc_host.llnl.gov>
```

For more information about using SSH to access LC systems, go to http://www.llnl.gov/computing/hpc/access/ssh.outside.html

Where Can I Keep My Files?
Home Directory

When you log onto any LC system, you will be placed in your home directory. Your home directory is shared globally across all LC systems (one on OCF and one on SCF). The home directory is backed up and is not subject to purge but is subject to quota limits. There is an online backup of the past 48 hours in your home directory. From your home directory, you can cd .snapshot to see those files (even though ls will not list .snapshot).

The types of user login files ("dot" files) in your home directory are:
- Master dot files that are executed upon login to all LC systems.
  tcsh, csh users: .cshrc, .login
  ksh users: .kshrc or .kshenv and .profile
  bash users: None. Users must create their own.
- System-specific dot files that are executed only upon login to specific hosts. Example:
  .login.linux is executed only upon login to the Linux machines.

For more information about home directories, see the Common Home Reference Manual.[c]

Temporary File Systems

There are several temporary file system choices on LC systems.

/nfs/tmpN Large file systems, globally available to all LC systems. There is a 100 GB crash barrier per user.
OCF: /nfs/tmp1, /nfs/tmp2, and /nfs/tmp3
SCF: /nfs/tmp1, /nfs/tmp3

/var/tmp Each node has a smaller, local /var/tmp accessible only from that node.

/tmp Each node has a very small local /tmp. **Not recommended for use**.

All temporary file systems share these characteristics:

- They are not backed up.
- Files are subject to purge as needed. The purge may remove files that meet a criterion, usually more than 10 days since last access (or 5 days when necessary) to make room on the file system.
- For long-term storage of files, use the archival storage facility.

Parallel File Systems

For resources with parallel file systems, this temporary space is typically found in a directory named with /p/gXN , where "X" is the first letter of the system's name (as in "m" for mcr) and where "N" is a single digit (as in /p/gm1). The exceptions are the Adelie and Emperor systems, where "gX" is replaced by "ba" (as in /p/ba3). The other exception is TC2K, where the parallel file system is in /cpfs.

There are no quotas or barriers on the parallel file systems, but they are subject to purging as described in the news item accessible by typing news purge.policy.

For more information on LC file systems, see the EZFILES Basic File Management Guide.[c]

Storage (High-Performance Storage System)

HPSS is an archival storage facility on both the OCF and SCF. This facility provides unlimited long-term storage on tape for each user. All LC users are given a storage account.

To access your storage account, use ftp storage.llnl.gov. Use FTP commands to put files into storage and to retrieve them. Other higher-performance interfaces to storage exist; see the EZSTORAGE Basic File Storage Guide.[c]

Development Environment

The Development Environment Group (DEG) provides support for compilers, debuggers, performance analysis tools, and parallel tools and libraries on all LC platforms. Languages include C, C++, Fortran (f77, f90, f95), and parallelization includes MPI, MPICH, HPF, OpenMP, and Pthreads. Some helpful DEG web pages are:

- **Development Environment Group**
  http://www.llnl.gov/icc/lc/DEG/
- **Supported Software**
  http://www.llnl.gov/icc/lc/DEG/DEG.software.html
- **Compilers Available**
  http://www.llnl.gov/asci/platforms/bluepac/CompsAvails.html
- **Fortran Programming Environment**
  http://www.llnl.gov/icc/lc/asci/fpe/fpe.html
- **OpenMP Status on LLNL Machines**
  http://www.llnl.gov/asci/platforms/bluepac/OpenMP.Status.html
- **MPI/MPICH Usage**
  http://www.llnl.gov/computing/mpi/libraries.html

Livermore Computing Resource Management System

Most user work on LC systems is done within LC's batch handling system, LCRM. LCRM allows more efficient use of LC systems, and LCRM jobs receive greater resources, in CPU time, memory, and number of nodes, than interactive jobs. Jobs are submitted by the psub command and can be monitored by the pstat command. For more information:

- See man psub and man pstat
- Consult the EZJOBCONTROL Basic Job and Batch Guide[c]
- Type news job.limits on any LC system for information about batch and interactive job limits
- Read "Status Values for Batch Jobs" in the "Operating Features" section of the DPCS/LCRM Reference Manual[c]

File Interchange Service

The File Interchange Service (FIS) can be used to move files from the OCF to the SCF. You must request a FIS account from the LC Hotline to use this service. For information about FIS, refer to the File Interchange Service Manual.[c]

4HELP

For support for desktop computer users, contact the 4Help desk.

- Open for calls Monday through Friday, 8–12, 1–4:45
- Phone: 4-HELP (4-4357)
- E-mail: 4help@llnl.gov
- Web: http://www-r.llnl.gov/computing/desktop/

How Do I Get Additional Information?

Important or Urgent News

- **Message of the day** (MOTD): The announcements print out when you log in.
- **News postings**: Latest news items are listed following MOTD. Read by entering news <item_name>
- **Technical Bulletins**: Sent out in hardcopy on-site and accessible from the LC Computing Web page at http://www.llnl.gov/computing/hpc/
- **Machine status**: http://www.llnl.gov/computing/status/

E-mail Lists

You are automatically subscribed to an e-mail list for each system or group of systems on which you receive an account. You will be alerted to changes, scheduled events, and problems on the relevant system(s) by e-mail.

On the Web

The Computing home page includes Important Notices and links for many subject areas, including:

- **Technical Bulletins**
  https://lc.llnl.gov/computing/techbulletins/
- **Forms**
  https://www.llnl.gov/lcforms/
- **Training** (tutorials)
  http://www.llnl.gov/computing/hpc/training/
- **Documentation**
  http://www.llnl.gov/computing/hpc/documentation/

[c]Reference documents can be accessed at
http://www.llnl.gov/computing/hpc/documentation/

LC Quick Guide

Welcome to Livermore Computing. The information you find here will guide you to trouble-free high-performance computing.

If you have questions, we offer you many avenues for help, whether by consulting one of our many Web pages designed to solve problems or by calling or e-mailing us.

User information

http://www.llnl.gov/computing/

SCF only

https://lc.llnl.gov/computing/

If you have questions, please contact the LC Hotline

OCF e-mail: lc-hotline@llnl.gov

SCF e-mail: lc-hotline@pop.llnl.gov

Phone: (925) 422-4531

Walk-in: B113, Room 1206

Desktop to Teraflop Computing at
Lawrence Livermore National Laboratory